



Located between 60 and 180 kilometers above Earth, exists an ambiguous region called the Mesosphere, Lower Thermosphere/Ionosphere, or MLTI. Here the air pressure is a thousand to a trillion times less than at sea level. Atoms in this region have their electrons torn away by X-rays and ultraviolet light from the Sun, creating an electrified gas used by ham radio operators as a mirror to bounce transmissions around the world. The MLTI region also is home to the silent blue-green fire in the sky known as the aurora and to thin, luminous clouds called noctilucent clouds, which are visible only against a twilight sky.

The Thermosphere•Ionosphere•Mesosphere•Energetics and Dynamics (TIMED) satellite employs advances in remote-sensing technology to globally observe this relatively unexplored frontier. During its two-year mission, TIMED will make direct measurements of the MLTI region's various energy inputs and outputs, obtaining data on its winds, density and temperature profiles. Scientists need to understand more about this region so they can better predict its effects on communications, satellite tracking, spacecraft lifetimes, degradation of spacecraft materials and reentry of piloted vehicles. TIMED is the first NASA mission to offer such a global study of the MLTI region.

Instrument Payload

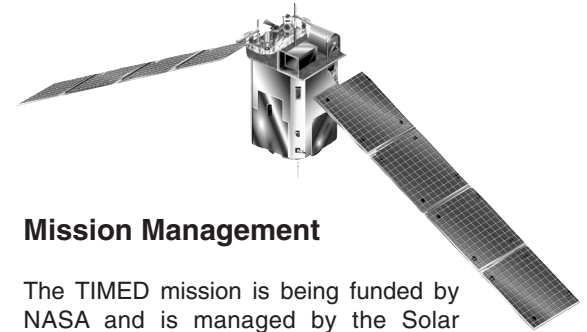
TIMED's payload consists of four instruments that study the basic structure of the MLTI region, its chemistry and the flows of energy to and from this layer of the atmosphere.

- The Global UltraViolet Imager (GUVI) studies the glow of the MLTI region in ultraviolet light, which helps scientists to determine its chemical composition and temperature range. It will also measure the energy input by solar ultraviolet light and by the aurora.

- The Solar Extreme ultraviolet Experiment (SEE) has a spectrometer and a suite of photometers that measure solar ultraviolet radiation - the primary energy that is deposited into the MLTI region.

- The TIMED Doppler Interferometer (TIDI) globally measures the winds and temperature profiles of the MLTI region. TIDI determines the speed and direction of winds in the atmosphere by measuring tiny shift in the color of light emitted from individual chemical constituents in the atmosphere, like atomic oxygen, molecular oxygen and sodium.

- The Sounding of the Atmosphere using Broadband Emission Radiometry (SABER) measures a wide range of infrared light that is invisible to the human eye and emitted by the atmosphere at many different altitudes.



Mission Management

The TIMED mission is being funded by NASA and is managed by the Solar Terrestrial Probes Program at Goddard Space Flight Center, Greenbelt, Md. The Johns Hopkins University Applied Physics Laboratory in Laurel, Md. is responsible for the design, construction, integration, testing and operation of the TIMED spacecraft.

For the Classroom

1. TIMED will study a certain region of the Earth's atmosphere. Why is it important to learn about this area?
2. TIMED looks at the MLTI region using Infrared (IR) and UltraViolet (UV) instruments. What can you find out about IR and UV? Where do they fit in on our electromagnetic spectrum?
3. TIMED orbits above the MLTI region and takes measurements looking down. Find out why TIMED cannot be placed into orbit within this region.
4. Other Sun-Earth Connection missions will study auroras. What can you find out about auroras and how they occur?
5. What NASA Program is sponsoring TIMED and why is this program important to the space science community and the general public?

For further information on TIMED: <http://stp.gsfc.nasa.gov/missions/timed/timed.htm>

